TENNESSEE VALLEY AUTHORITY

U. S. ENVIRONMENTAL PROTECTION AGENCY

TENNESSEE DEPARTMENT OF ENVIRONMENT & CONSERVATION

QUARTERLY PUBLIC MEETING

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ROANE COUNTY HIGH SCHOOL

KINGSTON, TENNESSEE

APPEARANCES:

CRAIG ZELLER, EPA

PUBLIC MEETING

MR. ZELLER: Good evening. My name is Craig Zeller. I'm the EPA project manager that's been overseeing kind of this TVA Kingston ash recovery project here for, I guess, the last four or five years and I'm glad you came out to hear some things we have to talk about tonight. Tonight we're going to really kind of cover and give you a project update, what we've been up to.

And really the last time, I guess, we were up here in the high school was around November of last year. We were talking about the -- kind of the monitored natural recovery remedy for the river system. I want to talk a little bit about what the construction activities are that have been going on out there and also then kind of delineate and outline the long-term monitoring plan for the river system that we've developed and share that with you.

So kind of the overview, the things I'm going to be covering today, I've got

about 20 slides. I hope to get through them in about 30 minutes. We do have time for Q and A and we'll obviously be around here as long as we have questions to answer.

So the first four things we're going to talk about is kind of give you an update on what we're calling the Phase 2 construction. This is everything that's going on in the cell. We're going to cover, you know, what we've been doing as far as ash excavation, ash stacking, how the perimeter wall stabilization construction is coming along and look ahead to the cap and closure of this thing. It's coming up here in about two weeks. Give you a little update on the restoration, the park development, the recreation system that's going to be developed out there and then I have about six or eight slides to talk about the long-term monitoring plan.

So for those that need maybe just a little refresher, when we got started on this thing and EPA got involved and

started working with EPA -- excuse me -- TVA and the State of Tennessee, we split this thing into three phases.

Phase 1 has been done now for a couple of years. Just for kind of a reminder, it was the dredging work that was done in the Emory River over about an 18-month period. From around say May of '09 up to about December of 2010 we were doing the time critical dredging phase during that time. We hit it with a bunch of hydraulic dredges and removed about 3 and a half million cubic yards of ash from the river system. That ash was processed on site. It was dried and put on 414 trains and railed about 325 miles down to an approved landfill in Perry County, Alabama.

The river -- the dredging phase was largely over around Memorial day of 2010. We still had about 500,000 cubic yards of ash on site to process. The very last train, train 414, went to Perry County on December 1 of 2010. So Phase 1 has been completed for a while. My colleague Leo

was the one that was in kind of charge of that.

I've been in charge of really the Phase 2 and the Phase 3. Phase 2 is ongoing. It's being conducted through a decision document that was issued in May of 2010. Phase 2 deals with the remaining ash, about 2.8 million cubic yards of ash that was in kind of these shallow backwaters or what we call embayments of Watts Bar Reservoir, the north embayment and the middle embayment. It also involves the construction of this perimeter stabilization wall to prevent future failures.

Phase 3 is the residual ash study. That was about a two-year, $40 million study that was done to look at the ecological and human risks associated with leaving some ash in place. We'll get into that a little bit later.

A little bit about the project schedule. This may be hard for you all to see. But down in the left-hand column are kind of the major things that we have

going out there in the Phase 2 work. We're building wall, we're excavating ash, we're stacking that ash, we're going to close that cell with a final cap and we're doing the restoration work over on Lakeshore and soon, I guess in the coming years, over in Berkshire.

On the perimeter stabilization wall, again, this is the wall designed to prevent against liquefaction. We are actually ahead of schedule on the wall. A year ago if I was sitting here and I could tell you guys we were ahead of schedule by about 45 days, you'd think I was probably crazy. But we have actually hit our stride with the wall and I'll show you some slides on that.

We're going to be building that wall. The new wall should be constructed and all the new construction should be done by the end of September. We have some fixes and mitigations to do. We'll probably be done building the wall about the first part of next year.

The embayment ash removal, I'm

pleased to tell you that in about another 30 days we are going to be done with excavating ash. We've been excavating ash out here about every day for four and a half years and that's just about done. We've got about another 70,000 cubic yards of ash to come out of that middle embayment, so we're extremely excited about that. It's a huge milestone to get to the point we're actually done digging up ash from the lake.

Ash stacking. We're going to be stacking ash through the rest of this year and into '14. I'll get more into that. Cap and closure is just getting ready to start. We actually have liner, six loads of liner showing up on site next week.

Then kind of the redevelopment piece, the Lakeshore redevelopment from the homes that were -- there was 30 or 40 homes that were taken down over there on the Lakeshore peninsula. That's now being replaced with a trail system, docks and restroom facilities. It will be turned into a park for the citizens of Roane

County to enjoy. That's kind of just a general overview.

Drill down a little bit and get some of the details. On the excavation, like I said, we've been excavating ash out here for about four and half years, since we got started. The first area we mechanically excavated was this east embayment. There was about 750,000 cubic yards of ash removed from the east embayment. That was all done during Phase 1.

After we got done with the east embayment, this is where I kind of got started on this thing. In the north embayment, just north of Swan Pond Circle Road, there was about a million cubic yards that was pulled out of there. Really most of that work was done in November of 2011 -- or excuse me -- calendar year 2011 and completed in November. It took about 13 months. As you all know now that live in the area, that feature, it's about a 60- or 70-acre area is now full of water. Good to see

that.

We then since have turned our attention to the middle embayment. We've spent most of 20 -- all of 2012 in there and about half of 2013 in the middle embayment. We're about 94 percent complete in there. We've got just under 1.2 million cubic yards left. We've got -- excuse me -- removed. We've got about 70,000 cubic yards left. And we started to pull out this Dike 2, which was a temporary measure to kind of keep the ash in place and keep the lake from backing in there.

This is what I was saying earlier. You know, it really tickles me to know that in about 30 days we're going to be done excavating ash. It's a tremendous amount of work. About 3 million cubic yards have been mechanically moved with excavators. This is not dredgers. This is track excavators moving it one scoop at a time.

It's also kind of good to know that we estimated earlier on when we first got

started here that there was 2.8 million cubic yards of ash that we had to remove from basically these two areas. Four years later we're about done and we're projected to have about 3 million cubic yards. So we missed that by .2 million or 200,000. But if you consider that we put 180,000 cubic yards down for Dike 2 as a temporary kind of containment measure, we missed our estimate by less than a percent. I never see that happen. Most of our volume increases always go up. We say there's 100,000 and we get in there and there's 150,000. So our estimates were right on. We didn't miss it by much. So it's encouraging to know that we had a real good handle on what we were faced with and our volumes came in right about what they -- what we thought they would be.

Okay. So ash stacking. What are we doing with all this ash under Phase 2. Once we excavate all this ash from the north and the middle embayment, it's brought up into the cell, into this area

generally. That material has got to -- it's wet because it's coming out of what was once lake, so it needs to be dried to optimum moisture content.

We wind row it and we kind of call it farming ash. We put this stuff up on the relic and we run discs over it and let the sun and the wind get to it. Once it gets to that optimum moisture content, then we put it back in the cell that previously failed and it's rolled out in basically one-foot lifts with a smooth drum roller and compacted to the target densities.

So we've processed a lot of ash outside -- or inside this cell area. We've processed about 3.6 million cubic yards of this material that's went back in the cell. We have about 1.8 million left. So we're about two-thirds done with ash stacking. We've made a tremendous amount of progress. As I mentioned, we'll be stacking ash for the rest of this year and probably about the first half of '14.

Just some pictures here. This is

-- we have around eight to ten of these John Deere tractors out there that have pans on them. They drop those pans, they pull over, they scrape that material up and then take it to the various areas that we're trying to stack this in here, in this about 230-acre cell.

Okay. Where is that material coming from. I said we have about 1.8 million cubic yards of ash to yet process. It's been kind of joked on the site that we have 1.8 million cubic yards of ash in our left pocket and we've got to get that 1.8 million cubic yards of ash in our right pocket. Because now this is all back in the cell. This is not coming from the lake.

It's kind of complicated maybe to see this. But the areas that are in red and yellow are cut areas. Those are areas that we have to cut material off. The areas that are in blue are areas where we have to fill.

So we get a lot of questions. I think the most popular question we get is

how high is this cell going to be when we're done. Well, if you're driving down Swan Pond Road and you're looking here in the north end kind of by the Geocon batch plant, that area of the cell is at final grade or at least subgrade. It's going to be about 2 or 3 feet higher. So we're generally at grade of final closure here in this kind of north, what is that, west corner.

We're going to -- this relic area, the area that did not move during the cell failure, is still about 10 to 15 feet high. So if you just kind of -- you've got to look at the cut and fill balance. This material has got to be cut from here and basically placed in these areas. Just to kind of give you an idea of where the material is going to go.

Okay. So the perimeter wall stabilization, this is kind of the -- to me it's kind of the neat part of this job. It is going to be the largest slurry wall ever constructed in the United States. It's about 2 miles around this 230- or

240-acre cell. It's kind of constructed of a grid, an interlocking grids and panels of this slurry wall. This slurry wall is about 4 feet wide. When we're all said and done, there's going to be about 60,000 linear feet of slurry wall 4 foot wide around this thing. It's about 11 miles. So it's a big -- it's a big thing.

It's being designed to withstand these earthquake magnitude forces. When we did the root cause analysis on what caused the failure in the first place, it was attributed to many things. One of the things it was attributed to was a weak foundation. So this perimeter stabilization wall is actually going 50 to 70 feet into the subsurface through saturated ash and being keyed into the underlying bedrock. That kind of keys it in and prevents that sliding force and prevents any liquefaction forces that could be caused by a 6.0 magnitude quake on the East Tennessee fault line or a 7.6 magnitude quake on the New Madrid. By

doing this we're going to create about 500,000 cubic yards of slurry. So not an insignificant volume. Our productivity has really come up here recently.

In addition to the new construction on the wall, we do test this wall to make sure. We put cores down through it to make sure it's meeting several criteria, several specifications. One is strength. We want this thing to be about 285 PSI, or pounds per square inch, and we want this thing to be uniform. All right. In other words, we don't want big pockets of ash. We want this thing well mixed so it reaches, you know, that strength criteria and will hold up to these earthquake forces.

So in areas where we core and we find inclusions, a fancy word for unmixed material, we are actually going back in and pressure grouting. We're drilling holes through these areas of the wall and pressure grouting this mixture. The recipe that we're using is a lot of water. But besides water, it's about 22 percent

blast furnace slag, it's about 3 percent bentonite which is clay, and it's about a half a percent of Portland concrete which kind of precipitates that batch and makes it hard. And that's being mixed in that batch plant that you can see right off of Swan Pond Road near the intersection with Swan Pond Circle.

We've made great strides with this wall. It's being constructed with some of the largest excavators I've ever seen that have been around. It's a Komatsu 1250. It's got a hundred foot boom length on it. So it has a depth on it of about 90 feet before it starts to lose its strength. On the end of that bucket or on the end of that boom is a 4-foot-wide bucket that's big old ripper teeth that allows us to get down to that shale bedrock and then cut into and key it into that shale bedrock. We are about 85 percent complete which is -- we started full scale construction on this thing in July of 2010. So we've come a long ways.

The last two segments we're

building now. There are a total of eight segments. We're working on Segments 5 and 6 now. Those are the ones that are closest to the ash trailers. And as you drive by on Swan Pond Road, you can see where those excavators are working at now. Segment 5 is about 30 percent complete and Segment 6 is about 60 percent complete. We were hoping to be done with new wall construction -- it's actually running about 45 days ahead, which is a good thing. We hope to be done with new wall construction by September.

Now, after we're done with new wall construction, we have to do the repairs and the mitigation for these areas that we're seeing exclusions -- inclusions. Excuse me. We'll probably be doing mitigation on this thing certainly through the end of this year and perhaps, depending on how our productivity goes, maybe into -- a little bit into '14.

So it's actually going real well. We're building so much wall sometimes so fast that we're actually running out of

material to put in it. Actually the feed stack. We're running out of slag. We're burning through the stuff and getting it down so fast that sometimes our suppliers are having a hard time keeping up with us.

Okay. A little bit of cap and cover. What's happening. You know, that's what we've been doing. We've been doing that for about four years. We're going to be doing that for a little while longer. What's coming. Well, the next part that's coming is the cap and cover of this thing. So once we get all this ash in place, we're going to cover it and we're going to prepare that ash subgrade to about an elevation of roughly 787 feet above sea level.

Then the next thing that goes down is plastic. The fancy term is HDPE, or high density polyethylene. It's going to be 40 millimeters thick. On top of that liner -- that liner is going to be rolled out in sections and all the seams then are welded with extrusion welding that actually melts the plastic together to

create one big giant liner on top of this thing. That liner is designed to keep rainfall from infiltrating into the cell. All right. We want to shed that rainfall that comes down and get it off the landfill.

On top of the liner, then the next layer is a drainage layer. We call it a geo-composite drainage layer. Think of it as sand. It's a manufactured sand layer. As the water infiltrates through this topsoil, which is the next one, it gets to that drainage layer and that water then is shed off the top of this cell and is not allowed to infiltrate into the cell.

So on top of the drainage layer then goes 2 feet of clay and topsoil. It's actually 20 inches of clay. Most of that clay, if not all of that clay, is going to come from the Gupton Farm in the Berkshire area, property that TVA has acquired. Most of that delay is local, very local. It's actually in the same zip code. And most of that's not -- hopefully not going to be on the roads. We're going

to be hauling that clay from the Gupton Farm area underneath that underpass that we built on Swan Pond Circle Road and so we can keep those clay trucks off the road if at all possible.

The total area that we're going to cover is about 230 acres. That's the entire 2 miles around here. We have split this. Of course, you can't cap it all at once. We split it into seven areas. The first area we're going to cap right here is Area 1. If you're driving by on Swan Pond Circle and Swan Pond Road, you can see this area is getting rather flat. For the longest time I've been coming up here, I've gotten used to seeing irregular surfaces. Right? Mound here, valley here. Well, now this 22-acre, 25-acre area is very flat. It's a 1 percent grade. So it's kind of nice to see.

It's getting prepared and getting rock free. We're pulling out debris and roots and sticks that might potentially puncture our plastic liner. It's been smooth rolled and it's ready for liner.

As I mentioned earlier, we're getting six loads of liner next week.

For those that live in the area, we just advise you it's probably going to be a little busier than usual in here for a while because of all the material being delivered to put the cap down. But we hope -- the schedule right now is if the weather holds up on us, and it's been great for stacking ash and drying ash, we hope to start putting the first layers of liner down June 11th. So just about two weeks from now.

The goal is this summer to try to get 2 acres a day. I think probably like anything, we'll probably have to learn as we go on this thing. We probably won't be doing 2 acres a day right from the start. We're probably going to have to kind of walk before we can run. But everybody is very pleased with what we've heard so far about the liner contractors. We've been out and looked at some of their jobs and we're excited to start working with them.

All right. Just a picture of, you

know, what we've accomplished. This was, you know, immediately after the spill from about four and a half years ago. This is kind of -- we do aerials about once a month now so we can take, you know, a little look at what we've got going.

You can see again the north embayment has got water in it. It has had water in it for a number of -- at least a year or two. The middle embayment, if you drive by there you're starting to see a lot of brown dirt. As I mentioned, we only have -- we're about 94 percent complete in there, just about 70,000 cubic yards left. And when you see brown dirt out there, that's a good thing. That means we're no longer looking at gray ash and what was once, you know, a little portion of Watts Bar Reservoir.

So hopefully the plan is here to have the middle embayment ash free in about 30 days or the end of June and at that point in time we're pleased to report that we'll be done excavating material that escaped this ash impoundment about

four and half years ago. At the end of June, everything we do related to this recovery project, outside of the restoration work on Lakeshore and Gupton of course, is going to be in here, inside the closed out cell.

All right. Some of the new stuff, the stuff that comes here near the end is actually the restoration of these areas and some of the properties that TVA has acquired along the way here. The three general areas that we'll be talking about here is the Lakeshore Green Space, which is going to be kind of a passive park. That construction is under way. It started about a month ago or so.

Another area of restoration that we're going to be doing here is in the middle embayment. As you've heard from the start of this project, our goal, our team's goal, that includes EPA, TDEC and TVA, is to return this area to preexisting conditions and, if not, hopefully better.

So we're going to be putting all these islands that were once in there back

in there. We're going to be creating a bunch of additional fish habitat in the bottom, on the bottom of the lake in hopes that the fish will come back, which they will. And then the last part we're going to be doing is the recreation area on Berkshire as well as some of the wetlands and wildlife areas that we've got on the north part of the old Gupton Farm.

We had a helicopter on the site I think earlier in the week. It took a bunch of nice aerials. This is a picture of Lakeshore here. All the trails or most of the trails, anyhow, on the east embayment side or the Lakeshore Slough side have been put in. They've been paved. The trails on the Emory River side are going down as we speak. It's walking trails, fishing piers. There's several fishing piers and launches that are going to be out there. The pilings or the pylons for those have been put down. They were hammered in. Just waiting for the decking. You can see here our asphalt crews working and putting down the

handicapped trails. There's asphalt trails out there as well as going to be like pea gravel trails. So we'll have a combination of both. We hope to have all that work done by the end of this summer, by the end of August.

After that then it's kind of what we're calling Phase 2. It's some additional work on the Lakeshore side. There's going to be a big boat ramp and parking for those boats and trailers. There's going to be a walking bridge that crosses over from Lakeshore onto kind of the middle embayment side, more trails. And that work is scheduled to start this fall. Okay.

Then the final piece that won't begin really for another year or so is the Berkshire recreation area. This is the ball fields, soccer fields and all those facilities that will go into a recreation area that will be built out by Roane County and TVA will get it ready, get it all graded up and ready to go. All the finishing touches on that will be

implemented by Roane County Recs Department.

That's, again, about a year away. And why is that a year away? It's because we've got to get that clay out of there. I mentioned that most of the clay, if not all of the clay, for this cap is going to come from that Berkshire area. And so we've got to complete our borrow work on there, get it flat, get it ready to go to build ballparks basically.

Okay. So shifting gears from kind of what we're doing on the Phase 2 work and what's planned for the restoration of Lakeshore and Berkshire, what about this long-term monitoring plan. When we were up here last November, we'd worked a lot with a lot of y'all, Roane County Environmental Review Board, the Community Advisory Group and others that were interested, educating you up on ecological science and ecological risks. We released the EE/CA report for the river system in April of last year and then based on public comments received and consultations

with TDEC and TVA, EPA and the State of Tennessee did approve a monitored natural recovery remedy for the remaining ash in the river system.

Based on that two-year, $40 million study, what we found is there's about 510,000 cubic yards of ash that remains in that river system. It's spread over about 200 acres, primarily in the lower Emory River, from the lower, say, 3 miles of the Emory and about 2 miles of the Clinch.

After looking at all the risks, there was about 20 different things in the biology component that we actually sampled. After looking at all of those risks, we found the risks to be relatively low and maybe just slightly moderate. Based on some comments received from the public, we had some general support for monitored natural recovery. What that means, what does MNR mean, it's a fancy term for letting nature take care -- you know take care of this problem by itself. And I'll get more into, you know, the processes behind that.

But when we were having comments on our action memo, the one thing that we did get from folks, the one thing that they worried -- seemed to be interested in is they wanted to hear the details, what were the details behind it, what are you going to monitor for 30 years. So we think this is good, but, you know, we want you to come back and tell us, you know, what that program is going to look like. So that's one of the purposes that we're here tonight.

So going forward we have -- EPA and the State of Tennessee have approved the long-term monitoring plan that was approved by TVA. It's a 30-year program, but this first program or this first plan that we've approved is for 5 years. Okay. EPA has a process in place that's called a five-year review. So we've set kind of what we are proposing to do for long-term monitoring from 2013 up to 2017. At 2017 we're all going to sit down around the table again and say, okay, what data are we using, what data do we find of high

value, what data are we collecting but really not using much of.

So, you know, like most projects you sample for lots of things initially because you're really not sure what the impacts are and as you move forward into projects and you learn more about risks, those things that you're looking at starts to narrow. Okay. As I mentioned before, we looked at over 20 things in the biological department and moving forward here for the next five years, we've narrowed that down to basically six types of things we're going to be looking at. And I have a slide for each one of these.

We're going to be doing some continued sediment transport modeling, we're going to be looking, of course, at sediment quality, how long does it take for the sediment in these impacted areas of the river to get back to background or the natural conditions, we're going to be looking at the toxicity of that sediment and how that responds.

Benthic macroinvertebrates, a very

fancy term, a weird term for bugs. These are critters that live in the mud. We're going to be looking at tree swallows moving forward. These are aerial feeding insectivores, meaning they fly around and they eat bugs that are in the air. And, of course, fish. Everybody is interested in fish, of course.

So to drill down just a little bit more in detail, we'll go to sediment transport modeling. As some of you may recall, we, EPA, actually engaged the services of the U. S. Army Corps of Engineers, kind of a high level, you know, Ph.D. group out of Vicksburg, Mississippi. They call themselves the Engineering Research and Development Center. We engaged their efforts to do sediment transport modeling. It's two-dimensional. They run on one of these DOD super computers. Of each model run that we were running, it took about a week of super computing time. It had like 60,000 nodes. It took, you know, a lot of time to calculate.

And what we were looking for in this modeling effort is what areas scoured, moved sediment out, and what areas accumulated sediment or deposition. And what this model -- the big conclusion coming out of this model was that natural sedimentation coming in from the Emory, coming in from the Clinch, just good old, you know, fresh sediment now and then burial and mixing through storms would meet our sediment clean-up goals in a predicted time frame of 10 to 15 years. Okay. So we want to continue to follow this to see if that -- it's a model, all right, it's a prediction. We want to make sure that that's coming true in reality.

So what that model also said is that the big storm of significance where stuff starts to move around is this 10-year storm. A 10-year storm for the Emory is about 110,000 cubic feet per second, of CFS. Just to put that in perspective, the base flow of the Emory is about 1,000 CFS. So a lot of water. And so we know that this storm event is when

things start to mobilize and scour. So it's kind of the event that we're most interested in.

So what are we going to do with regard to sediment transport modeling. Well, we're going to update this. The bathymetry of this system has changed quite a bit. Right? River systems are dynamic, they're changing all the time through mobilization and flows. We're going to update the bathymetry. The bathymetry, again, is kind of a fancy word for what's the bottom contours look like, what's the bottom of this lake or the bottom of this pool look like. We're going to update that with more detailed bathymetry on 200-foot intervals and that's going to extend from Clinch River mile 2.0 just below the confluence, about 2 miles below the confluence of the Emory, up to ERM 5 which is about 3 miles upstream of the site.

Now, we're going to rerun that model when and if this ten-year storm event occurs, again, because we know

that's when all the action occurs. So once that storm occurs, we're going to rerun that model to see is it behaving like -- is the system behaving like we think it is, like the super computer is telling us. Then we're going to calibrate that or ground truth that with actual samples collected in the field. So we're going to go, okay, the model says we're getting deposition here, let's go out and collect some sediment samples and see in fact if that's what we're getting.

So we have Dr. Steve Scott on -- you know, under contract for the next five years to do this. If this ten-year storm -- he's the one that did all the work in Phase 3 for me. If this ten-year storm does not occur over the five-year period from 2013 to 2017, we will, of course, do it at the end of this first five-year period. So that's sediment transport modeling.

The next line of evidence we're going to use in our long-term monitoring program, of course, is sediment quality

sampling. We're interested in what concentrations of sediment in this river system are going to be long term. Of course, our model says they're going to decrease over time. That's intuitive, right, by mixing and burial. So we want to prove to ourselves and everyone else that it actually is happening.

So the clean-up goals that we're looking for, we're primarily interested in arsenic or selenium, inorganics or metals that are typically associated with coal ash. The clean-up goals that we're looking to get for -- in surface sediments are 29 to 41 for arsenic and pretty low for selenium, around 3 parts per million or milligrams per kilogram.

We are proposing 11 sample transects and these are going to be a combination of grabs and composites. What I mean by that is a grab sample is where you go to a spot in the river and just take a bucket or a sample or just pick that grab sample out, sample it or analyze it and see what the concentration is.

That's more of a spot check. All right. A composite sample is where you go to an area, like a transect from here to here, and maybe take four or five samples and all those samples then get deposited or dumped into one bucket. They're mixed and then you take one representative sample from that composite. So that gives you kind of a little weight of evidence for both. You get a spot check on what, you know, the concentration is right here on this little floor tile, but then you also get a representative average of what's kind of lake wide or a transect area, what's it look like. So it will be a combination of both.

But it's also a combination of both on frequency. We're going to do it every year at two transects. And those two transects are, of course, where we know the majority of this residual ash lies. It's in this last 2 miles of the Emory between right here, this is the Clinch River confluence, and we're going to do two transects at ERM 1 and ERM .7 every

year for the next five years. And then we're going to do it every other year for some of these other transects, four transects on the Emory, three on the Clinch and then, of course, reference stations.

What do I mean by a reference station? It's important when you're doing environmental investigations to not only determine and characterize what's in your potentially impacted area but also what's in and above, the areas that have not been impacted. We're trying to compare the background. The goal here really is to get back to what this system looked like before this spill occurred. So that's sediment quality.

The next line of evidence we're going to use moving forward is sediment toxicity, how do the bugs like this quality of sediment, are they surviving, are they growing. So we're going to use -- now, this is a laboratory experiment where we actually go in the field, we collect the sediment from these areas, we

take it back to the laboratory and then we expose this bug. The fancy Latin term is hyalella azteca. Kind of the common term is amphipods, a little bug that lives in the sediment interface, very important for the ecosystem. These are ten-day experiments. And what we're doing is monitoring how they grow and how they survive in this sediment. Do they like the sediment, are they growing, are they surviving. We use this, we've done this in the Phase 3 studies. We used hyalella azteca and another bug, it was a midge. We're proposing just to use the hyalella azteca on this one. We're going to do this at four locations, one at ERM -- ERM 1, of course, right in the middle of the potentially impacted area, we've got a reference station up here, we're going to do Clinch River 3 just below the plant and below the confluence and then also a reference station. We're going to do that once in 2013 and then again at the end in 2017.

Okay. Now, the bug work. Okay.

So it's important -- just like we found -- just kind of a quick review. When we were doing the Phase 3 work for the river system, we did sediment toxicity in the laboratory. Okay. And what it showed was slightly reduced growth and slightly reduced survival for a hyalella azteca, the amphipods, and the midge for those areas impacted by ash. But when we went to those areas and we picked up mud and we looked at what was living in the mud, those bugs were there. They were there in abundance and they were there in diversity. We not only saw pollution-tolerant bugs, but we also saw the ones that were a bit more sensitive. So it's important not just to do the laboratory work just because bugs sometimes, you know, behave differently in the laboratory than they do actually in the real world. So this is what this piece is for.

So with regard to the bug work or the benthic macroinvertebrate work, we're going to be coming at it with two things, bioaccumulation, are these bugs

accumulating arsenic or selenium that's found in the ash, and what does the community look like, when we pick up sediment, are there bugs, in fact, living there.

All these areas that are being sampled for benthic macroinvertebrates are generally collocated, located with the sediment samples, the 11 stations I mentioned earlier. We want to do that to increase our utilities so we know what the sediment quality is there and we know how the bugs are doing there. So it increases our utility there.

Some of the bugs that we're going to be sampling are larval mayflies. We did find in the Phase 3 work that these mayflies were accumulating primarily arsenic. And through the food chain models that we did, we showed a slight risk for the bugs that are eating mayfly -- birds -- excuse me -- that are eating the mayflies, primarily the tree swallows and the Killdare, we showed -- the food model showed some moderate risk there. So

that's why we're retaining larval mayflies. Again, in the worst impacted stations, the ones we're most worried about, we're going to do annually, again, for mayflies at ERM 1 right below the plant and then we're going to do every other year in '13, '15 and '17 at four stations in the Emory, two in the Clinch, two in the Tennessee and then four reference stations. Okay. So for a total of 12.

We're going to do some snails in 2013. The reason we're doing some snails is that there's a fish out there, the shellcracker, it's a red-eared sunfish, and he and she like to eat snails and we're seeing some trends in the shellcracker that we'd like to kind of further understand. So we're sampling some of their diet to see what the snail data tells us.

In addition to the bioaccumulation -- larval mayflies, of course, we're going to sample for arsenic and selenium. In addition to that, the bioaccumulation,

we're just going to be doing abundance and diversity, going out to these 11 stations, picking up mud, lake mud from these and seeing, you know, what's there. Are we getting abundance, are we getting diversity and so we can compare that to what we're getting in toxicity. Annually at the two Emory River stations and then, just like everything else, every other year for the other nine stations in '13, '15 and '17.

Tree swallows, an aerial feeding bird that loves to eat mayflies and other things like that. A lot of this work has been done by Virginia Tech in cooperation or under contract really to TVA. We're going to do this at two stations. We've scaled this back considerably. In the Phase 3 ecological studies, we had these boxes. What we do is we actually go out and set these bird boxes up. These tree swallows come back, inhabit the boxes and then we take their eggshells and analyze them for metals and then we actually analyze the egg contents as well to see if

they are accumulating metals associated with ash. And then we're also -- while we're in those boxes, we're going to be doing just some bio surveys looking at, you know, how many eggs have they laid, are they hatching, you know, and then how is the survival after 15 days. So some non-analytical parametrics we're going to be looking at, as well.

What else do we have? I'm getting pretty close to the end. I think I've just got another two more slides. Finally, fish. Fish bioaccumulation and bio surveys. Fish are important. You know, fish are important to this region because people like to fish, you know. So I think everybody that I've always worked with on this project is always interested in the fish and how are the fish, you know, responding to this ash release.

Historically we have sampled probably six or eight types of fish, looking at it and the stuff that we're the most interested in. The fish that we're carried forward to look at is going to be

bluegill, large-mouth bass and this red-eared sunfish. We're looking at three locations in the Emory and two in the Clinch. We're going to do that annually at ERM 1, again in this area. This is one area we're going to be collecting fish and sending them for analysis. Upstream here in the Clinch, downstream of the site here and it's just above the Tennessee and then another location here in the Emory and this is the reference.

We've also been cooperating and working very collaboratively with the folks out at Oak Ridge National Labs. We were fortunate to have them. They've been studying this system. Because of the Oak Ridge reservation issues they've had and the work they've been doing probably for the last 30 years, we've partnered with those scientists. They know this water body and this watershed probably better than anybody just because of their knowledge base and their experience out here. We are going to be doing some more fish health work and reproductive metrics

with them to see how the fish are actually -- you know, are they healthy? So far the answer is yes. The fish health and the fish reproduction to date has been very good. It has been not impacted. We want to make sure -- we're going to do that another year here to make sure that trend continues and we may or may not do that work in the future.

In addition, just like the bugs, where we're collecting bugs and sending them to the lab. In addition to that, we're also going to be doing bio surveys. We're interested in what kind of fish are out there. This is a non-lethal, we're not killing these fish. We just go in and we shock them and they float to the surface and we net them and we just count how many types of fish we saw, how big they were, look at them for, you know, what's their physical condition, do they have anomalies on them or lesions on their skin. So we're going to be looking at, you know, how many types of fish we caught, total fish caught, the diversity,

how many types of species, did we see big ones, little ones, different species like. That work is going to be done every other year in, '13, '15 and '17.

I think I have just one more slide. This is one you're not going to be able to see. It looks like an eye chart I'm sure you're sitting at. This slide is back there where Carol is sitting. It kind of gives you an idea of the level of work we're going to be doing for the next five years.

The point I want to drive home on this slide, it's really -- this is all not done in the spring. Okay. We collect fish for bioaccumulation in the spring, but the bug work and sediment work we'll be doing in the fall. So this work is really going to go on year round. Okay. It just depends on the various things.

Like larval mayflies, the only time you can catch larval mayflies is when they're coming out of sediment surface and flying away in the air. Near as I can tell in talking to the folks around here,

the mayflies have not come out of the mud yet. We're waiting for them to come out and when they do, we'll capture them. So, you know, again, the larval mayfly, we're forecasting done in the spring because that's when they come out.

Also another thing I want to drive home with this slide is this is not just TVA. TVA, of course, is paying for this like they've paid for everything else. TVA is doing some of this work. TVA has -- on all their reservoirs has been conducting their vital signs programs. A lot of this work is being done by TVA folks, just like they would always do, because that's part of their job. But a lot of this work, a good chunk of it's being done by Virginia Tech, some of this work is being done, as I mentioned, by ORNL. Of course, all this laboratory work is being sent to independent laboratories that have been approved by EPA and the State to make sure that the data they are generating is valid and that they can use it for decision making. If you want to

look more at that slide it's back there, after the meeting.

Finally, I guess this is my last slide, kind of summary and conclusions. If you're interested in the long-term monitoring plan, it is available. It's out there. I don't know if you're going to see that. It's on our webpage which is www.epakingstontva.com. It's also on TVA's dedicated webpage. It's tva.gov/kingston.

We have reinitiated some site tours. We've heard some folks that were interested in trying to -- hey, what are you all doing out there? So we want to accommodate that. Those tours are done once a month on the fourth Tuesday of the month from 10:00 to 11:00. They start at the overlook area. Bob Pullen, I've seen him around here. But if you're interested in a site tour, he's here someplace. This is Bob's e-mail address. Please shoot him an e-mail and he'd be happy to meet you at the overlook on the fourth Tuesday of every month and give you a kind of little

tour of what's going on out there.

Another thing that we're working on and hope to have it out soon is EPA in cooperation with TVA and the State generate a Community Involvement Plan. This is a document that describes to you all how we intend to get site information to you and keep you informed on what we're going to be up to here for the next year and a half. We hope to be done, you know, late '14, early '15. And this plan I hope to have out for y'all to look at. It's kind of some ideas of how we want to keep you informed.

We sent out some community surveys not too long ago to folks that we had been communicating with and working with here for the last four or five years and we learned some interesting things. One of the things we learned was that folks want to read about this in the paper. We always thought that people are going to our websites, people are going to our websites. But we found out that really they're not. You know, some are. But

they really -- we found out that a lot of people get their news from Knoxville news, from the Roane County local paper and so we're going to be probably exercising and using that a little bit more.

We found people like site tours which is kind of why we've, you know, kind of reinitiated that. We also found that some people would rather just come here and listen to me talk. You know, I don't know why you'd want to do that for 45 minutes, but it's easier to get your information that way. So we're trying to incorporate some changes.

You know, we're not done here yet. We're going to -- we're committed to getting this thing finished, you know, again, over the next probably pretty busy year and a half. We hope to have this thing turned over into parks and beneficial things for the folks of Roane County here in about 18 months. So if there's any questions, this is how you reach me. I'm typically pretty good about returning e-mails. You can also -- you

can call my cell phones and stuff.

But that, I'm done talking. I'd be happy to answer any questions y'all may have. I would appreciate -- or thank you for coming out. Thank you for your time. Y'all are going to let me off easy. Yes sir.

PUBLIC SPEAKING: You have this capped area and you have a flat up there. Do you have any plans for use of that?

MR. ZELLER: The question is we're making this area flat, the cap area, and do we have any future use plan for that 230-acre capped area. The answer is no. We're going to cap and close it. It's 1 percent grade. It's a very, very small grade. You really can't tell it if you're standing out there, to drain. But it's going to be turned over to the active Kingston plant for their long-term maintenance.

And there won't be -- a lot of landfills are returned to golf courses, driving ranges and things like that. We looked at some beneficial reuse of this

thing. It was talked about in the Phase 2 action memo a couple of years ago. And we're just going to turn this over to the Kingston Fossil Plant and have them maintain it. In other words, instead of beneficial reuse on the landfill, we're going to create opportunities for beneficial reuse at Lakeshore, at Berkshire and the like. It's a better fit. Good question.

PUBLIC SPEAKER: I'm wondering who is going to monitor fish that are consumed by people like catfish.

MR. ZELLER: That's a good question, Lynn. When we chose the species that we're going to sample moving forward -- like I said, historically we've monitored anywhere from six to eight fish -- we chose to go with bluegill. That's kind of a forward fish, it's kind of the smaller fish. The bigger fish are -- the one we're interested in for game fish consumption is we're using large-mouth bass is what we're using. Again, it would be kind of a surrogate of catfish.

The reason we're not showing -- we're not -- we dropped catfish is catfish, we just simply didn't see any increases in arsenic or selenium and over years of sampling. And if we haven't seen it in 2009, '10, '11 and '12 and most of that ash is out of there, we don't expect any concentration, say, upticks in catfish. Catfish are typically used because people, yes, do eat them and they're a bottom feeder. So you'd expect them to be, you know, maybe in contact with mud on the bottom of a lake a little bit more frequently, say, than large-mouth which eats forage fish. It's more of a carnivore. We decided to go with large-mouth just for that reason. We had to pick a surrogate.

You know, we're going to continue to cooperate with TDEC and Tennessee Department of Health that manages the fish advisory. As you all know, there is a fish advisory on this body of water. There was a fish advisory on this water body prespill and that was because of all

the legacy activities going on at the reservation. The fish advisory primarily is for mercury and PCBs, but we also have a little cesium 137 issue out there.

So we think we had enough trophic levels in our fish species going forward that we'll be able to assist in any modifications as warranted to the fish advisory. Gail.

PUBLIC SPEAKER: Craig, I'd like to know what's the trigger for the ten-year storm. You said that you were going to monitor the bottom contours and I want to know what triggers that ten-year and if we do have a ten-year storm event, are you going to re monitor that bottom?

MR. ZELLER: Absolutely. Yeah. What triggers it is flow. We've got river gauges out there. When the river goes above 110,000 CFS on flow, which we get daily. It's actually on the TVA webpage, the stream designer. So if it goes to, say, 120,000 CFS, we're going to crank that model back up and go out into the field after the storm settles, after the

water levels come back down, and go to those areas where we know -- where the model says we've got deposition and the model says we have scour and we're going to calibrate this with -- you know, not just rely on the model because the model is a tool. You know, always be careful how you interpret that. It's not absolute.

You know, the model told us going into this thing that we had anywhere from 1 to 5 feet of accumulation through this study area over a 30-year time frame. So we want to monitor that deposition. So after we get the storm trigger of 110,000 CFS, we want to go out to those areas and actually say, hey, what did we get? You know, so it's kind of a two-step approach there.

PUBLIC SPEAKER: I have one more question. Early on in the presentation you talked about measuring the target density in the cells. In the beginning TVA didn't have a well-defined process of monitoring that dike, from what I

understand. So is this important, that they monitor to get a target density in that cell?

MR. ZELLER: Absolutely. Yeah. It's very important. I can tell you with certainty --

PUBLIC SPEAKER: Is there a process that they've established to get to that target density?

MR. ZELLER: Sure. I can tell you with 100 percent certainty that this is probably the most monitored coal ash cell in the United States.

PUBLIC SPEAKER: Yes, but because --

MR. ZELLER: Yeah, because. There's a reason behind that, of course. But, yeah. On density, a couple of things to answer your question, Gail. When this ash is stacked back in the cell -- and we've got about, what did I say, 3, 3 and a half, 3.8 million back in there -- we're doing density tests, eight per acre. It's with a nuclear gauge and it's a little instrument our QAQC engineers take out and

they set it on the ground and they're monitoring for compaction. That's what density is.

And this stuff at optimum moisture content is running just under about 100 pounds per cubic foot. Okay. 90 -- depending on the moisture content, we're looking at anywhere from 80 to 90 pounds per cubic feet as the target for 90 percent proctor and we're getting that. We have an engineering firm out there which is called Stantec, which is the engineering of record, and they've got untold number of people supporting this project, not just on site but back in Lexington where they're based. And so we are monitoring the density of the ash we put back in there. As far as the wall, same thing. We're taking a bunch of cores from the wall to make sure it meets strength requirements as well as uniformity requirements.

Then going forward -- you know, maybe part of your question is, you know, concern over long term. Once we're done,

all the ash is put back in there, it's been capped, all the 230 acres have been capped. It's now end of 2014, early 2015 and this thing gets turned over, the ash trailers will be pulled out and the long-term maintenance of that facility is going to be turned over to KIF, to the fossil plant. To Leslie if she's still around or whoever, you know, Leslie's successor is. Or at least that's my understanding. And there will be a long-term monitoring plan that EPA and the State of Tennessee will approve.

We'll stay involved in the monitoring of that landfill and from the State of Tennessee it will go to Nashville. It goes to their solid waste program. It's a closed-out landfill. We have closed-out landfills all over the state of Tennessee. That group is very knowledgeable and they have lots of experience in that.

So the things that we're going to be looking at from that cell standpoint long term is does the cap stay in place,

you know, is the soil eroding off, is our vegetation still growing. We have an 80 percent success rate. We want, you know, a good stand of grass up there.

Of course, we are going to be monitoring groundwater quality for a long time out there. We're going to put a number of wells in making sure that the groundwater quality -- because right now the groundwater quality in that cell meets drinking water standards. Of course, you want it to stay that way. When you spend the kind of money we're spending on this thing, you know, we want to make sure it stays that way. So there will be a lot of stuff going on long term to make sure that landfill remains protective.

And that's -- TVA is committed to that. They're actually under -- the long term of protecting this thing, they're kind of locked into us through that administrative order. You know, I will go away. I probably won't be up here as much, but I guarantee you, you know, I will still be -- TVA Kingston will still

be a project of mine. I won't be probably billing the amount of hours that I do now to it, but annually as these reports come in for the river system and as these reports come in for the closure of the cell, of course, we'll be looking at that and making sure that it stays protective. You know, once we're done with it, it stays that way. That's always a big concern of ours.

So that long-term monitoring plan, we're starting to think about it, which is a good thing. You know, we've been able to kick that can down the road for a while. We kind of have a general idea what it's going to be in. There's going to be settlement. I think I left that out. You know, we want to make sure that one day the elevation is here and the next day there's a big hole in the ground, of course, we don't want those kind of things. So we'll be looking at settlement and movement. There will be a lot of instrumentation in that to make sure it stays protective. Good question.

PUBLIC SPEAKER: Thank you.

MR. ZELLER: Any other questions from you folks? Well, I do appreciate it. I know you probably have other things you want to be doing on beautiful summer nights. I do appreciate you coming out. And, again, we'll be around here as we kind of pick up and dismantle. If there's anything I can answer today or in the future, please don't hesitate to contact me. And, again, thank you for your time.

(MEETING CONCLUDED.)

REPORTER'S CERTIFICATE

STATE OF TENNESSEE:
COUNTY OF HAMILTON:

I, Tracy A. Beamon, Certified Court Reporter and Notary Public, do hereby certify that I reported in machine shorthand the May 30, 2013 Public Meeting in the above-styled cause; that the foregoing pages, numbered from 1 to 60, inclusive, were typed under my personal supervision and constitute a true record of said proceedings.

I further certify that I am not an attorney or counsel of any of the parties, nor a relative or employee of any attorney of counsel connected with the action, nor financially interested in the outcome of the action.

Witness my hand in the City of Chattanooga, County of Hamilton, State of Tennessee, this 25th day of June, 2013.

_____
Tracy A. Beamon, CCR-1003
My Commission Expires on the
18th day of February, 2015.